National Transportation Safety Board

Does your research change the world?

Robert L. Sumwalt, III

2014 NTSB Most Wanted List

- Helicopter safety
- GA hazardous weather
- Distractions in transportation
- Fire safety
- Occupant protection
- Passenger vessel safety
- Substance-impaired driving
- Pipeline safety
- Positive Train Control
- Rail Mass Transit

Things that keep Robert up at night

- Problems with flight path monitoring and cross-checking
- Lack of SOP discipline

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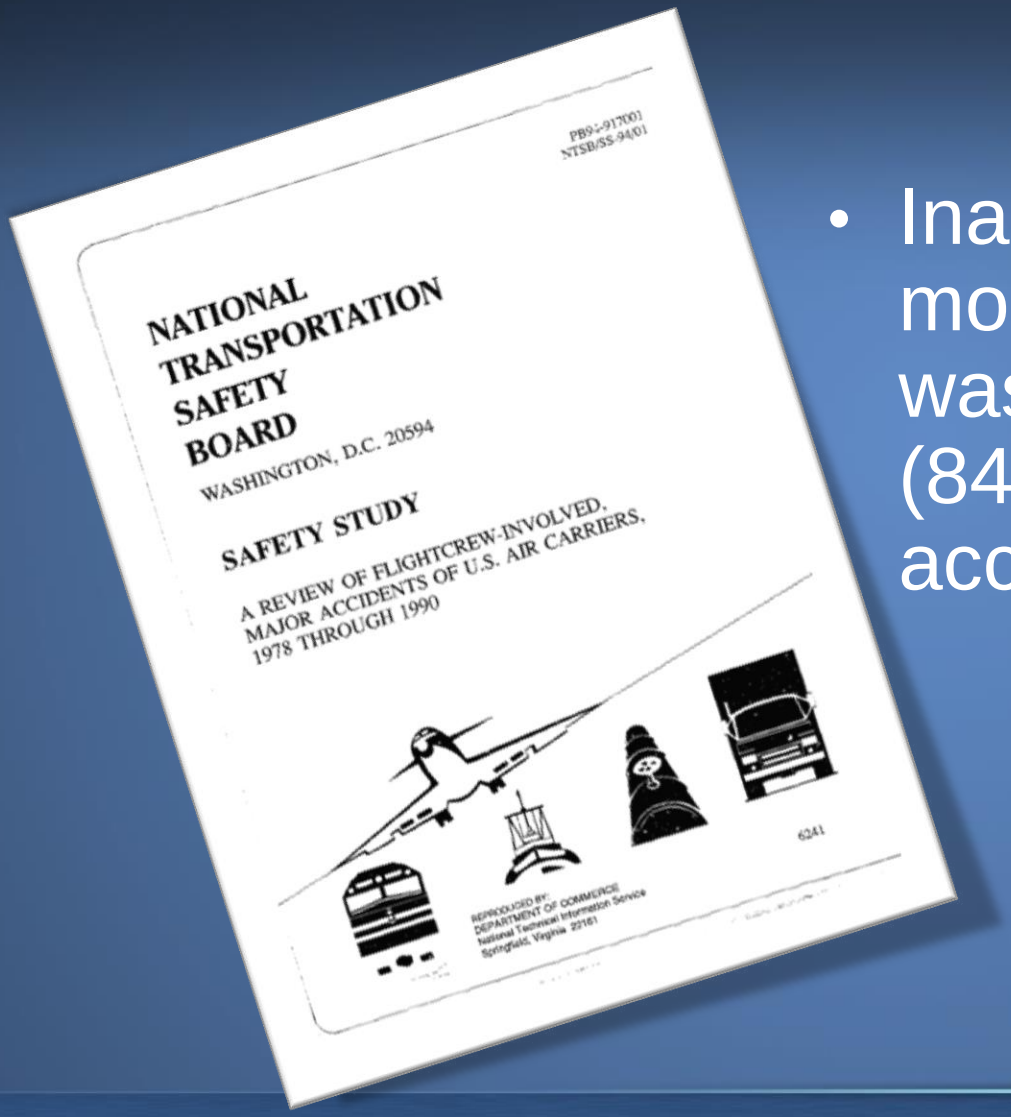
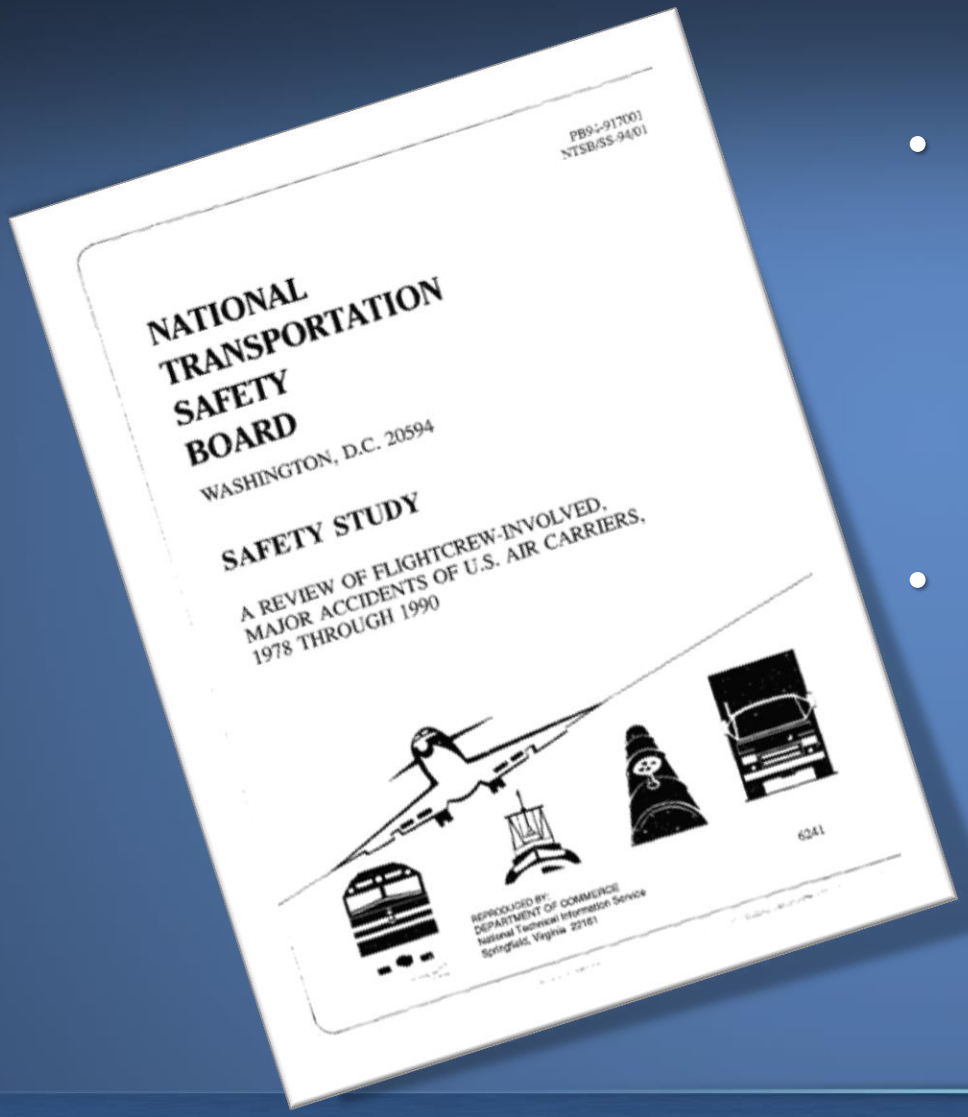


- Inadequate crew monitoring or challenging was a factor in 31 of 37 (84 percent) reviewed accidents.

Monitoring errors are serious



- 76% of the monitoring/challenging errors involved failure to catch something that was causal to the accident
- 17% of the monitoring/challenging errors were failure to catch something that contributed to the accident's cause

NTSB

G-III, Nov. 22, 2004 Houston

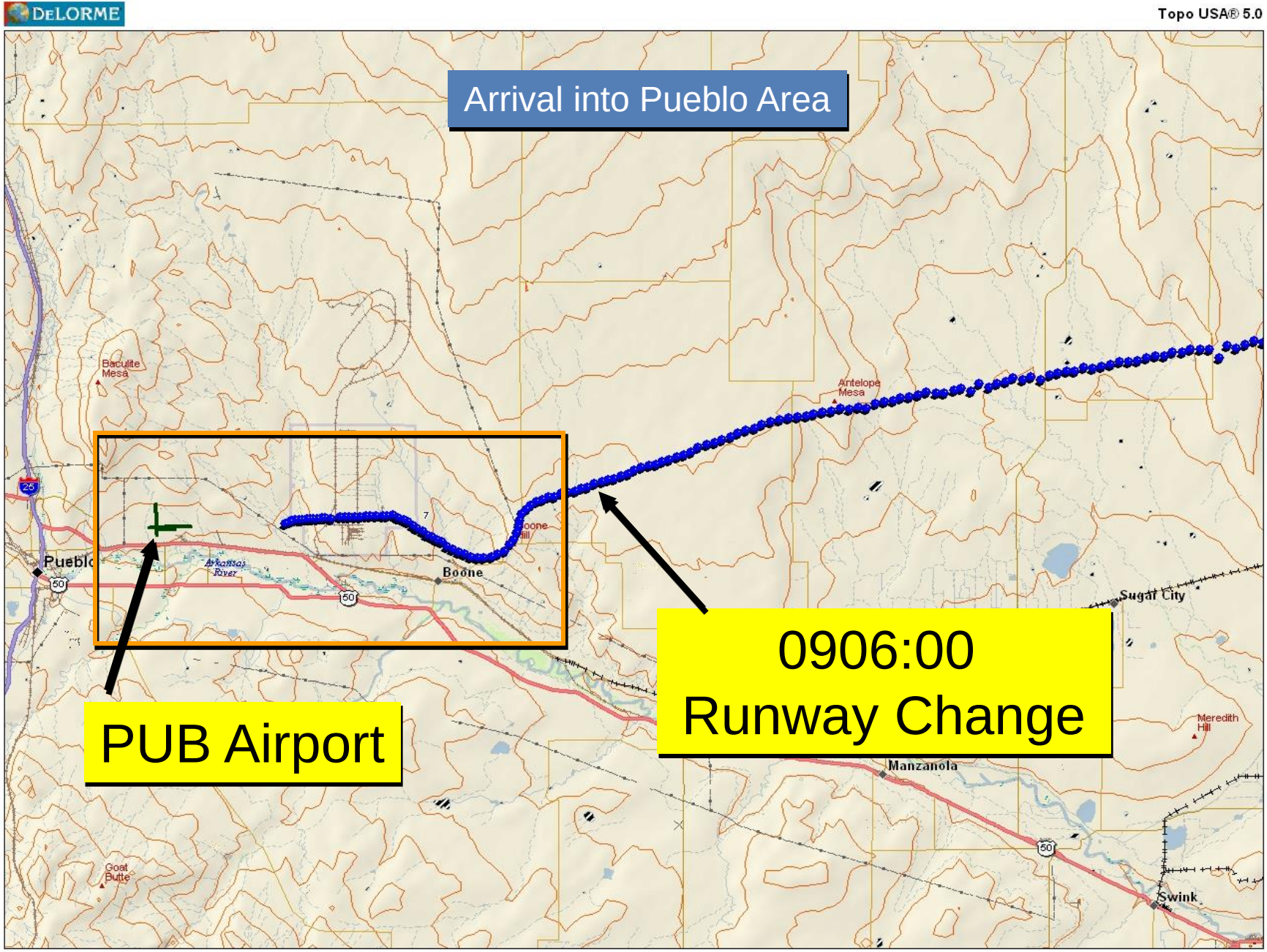
NTSB

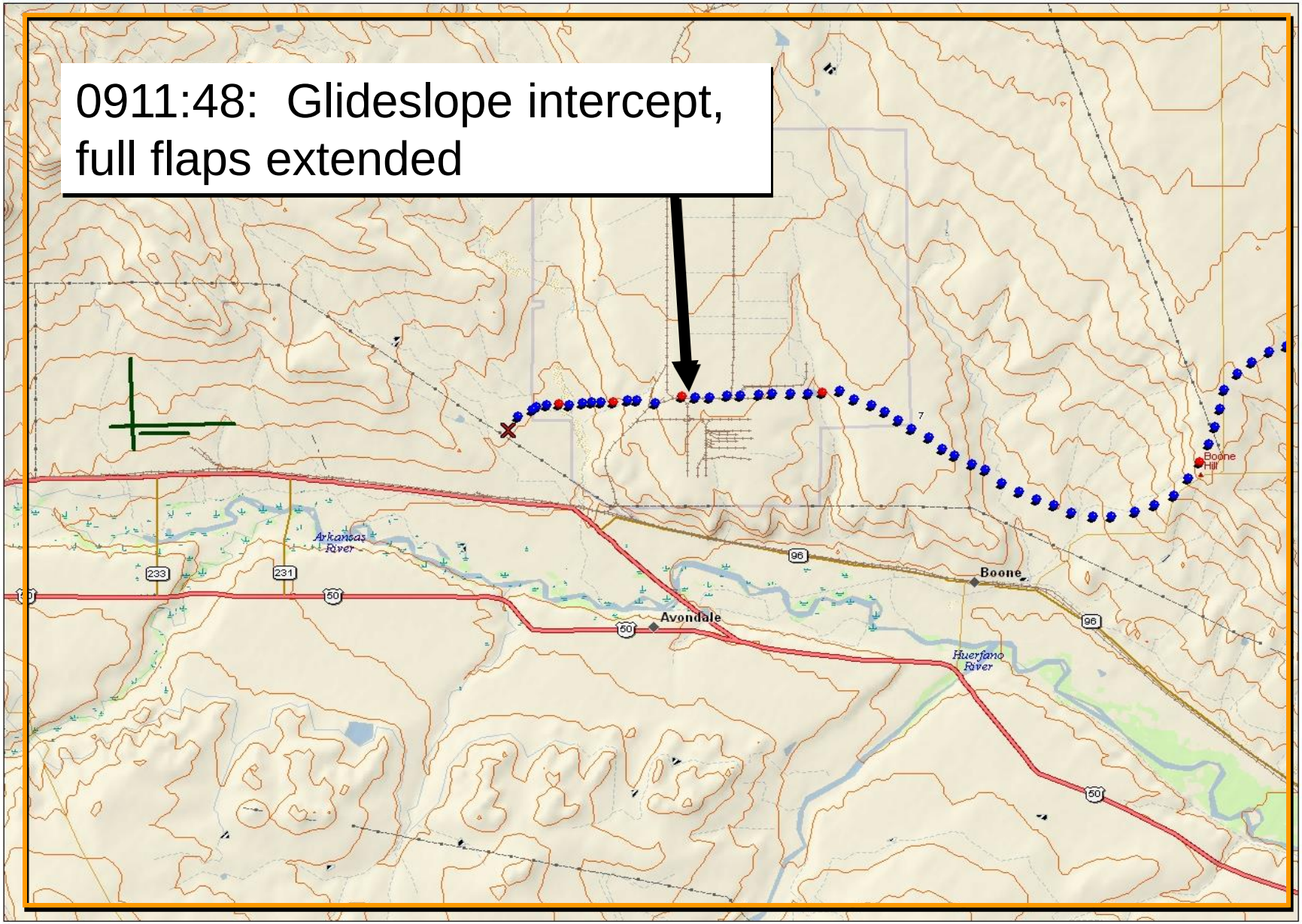
Probable Cause

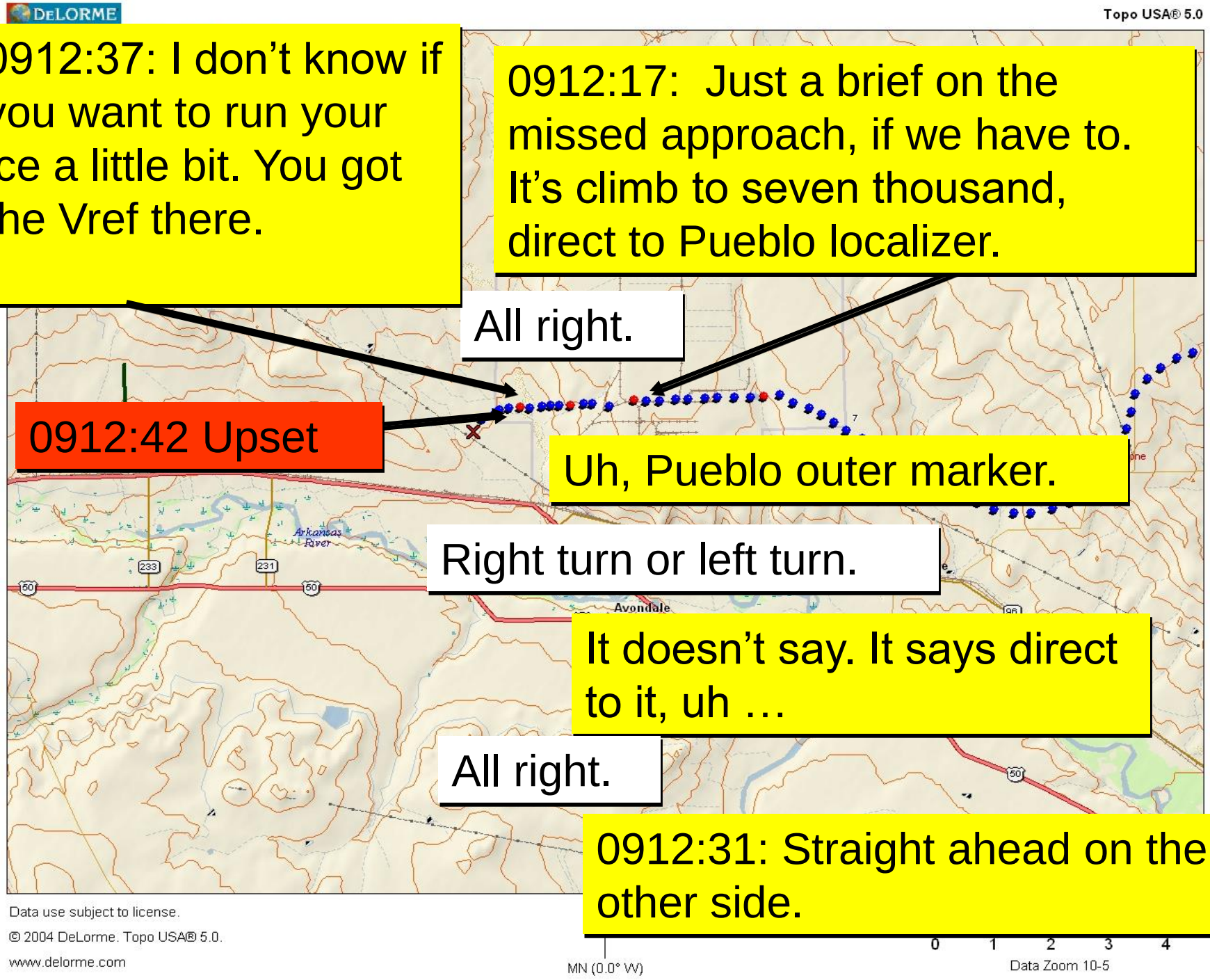
- "The flight crew's failure to adequately monitor and cross check the flight instruments during the approach…"

Accident Summary

- February 16, 2005
- Pueblo, CO
- Cessna Citation 560
  - Owned by Circuit City, Operated by Martinair
- Eight fatalities
- Part 91 flight


DeLORME
Topo USA® 5.0
Arrival into Pueblo Area
Baculite Mesa
Antelope Mesa
Pueblo
Boone
Arkansas River
Sugar City
Meredith Hill
Manzanola
Goat Butte
Swink
PUB Airport
0906:00
Runway Change
Data use subject to license.
© 2004 DeLorme. Topo USA® 5.0.
www.delorme.com
MN (0.0° W)
0 2 4 6 8 10 mi
Data Zoom 9-0


0911:48: Glideslope intercept, full flaps extended
DeLORME
Topo USA® 5.0
Arkansas River
Boone
Avondale
Huerfano River
Boone Hill
233
231
50
96
Data use subject to license.
© 2004 DeLorme. Topo USA® 5.0.
www.delorme.com
MN (0.0° W)
0 1 2 3 4 mi
Data Zoom 10-5


DeLORME
Topo USA® 5.0
0912:37: I don't know if you want to run your ice a little bit. You got the Vref there.
0912:17: Just a brief on the missed approach, if we have to. It's climb to seven thousand, direct to Pueblo localizer.
All right.
0912:42 Upset
Uh, Pueblo outer marker.
Right turn or left turn.
Arkansas River
233
231
50
Avondale
It doesn't say. It says direct to it, uh …
All right.
0912:31: Straight ahead on the other side.
Data use subject to license.
© 2004 DeLorme. Topo USA® 5.0.
www.delorme.com
MN (0.0° W)
0 1 2 3 4
Data Zoom 10-5

Probable Cause

"Flight crew's failure to effectively monitor and maintain airspeed and comply with procedures for deice boot activation on the approach, which caused an aerodynamic stall from which they did not recover."

NTSB Finding

- "All operators would benefit from an increased focus on providing monitoring skills in their training programs…"

NTSB Recommendation A-07-13 to FAA:

Require pilot training programs be modified to contain modules that teach and emphasize monitoring skills and workload management and include opportunities to practice and demonstrate proficiency in these areas.

Colgan Air flight 3407

HOT-2: gear's down.

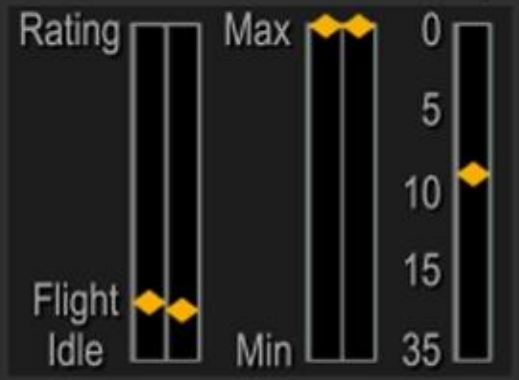
HOT-1: flaps fifteen before landing checklist.

HOT-2: uhhh.

National Transportation Safety Board *Board Meeting*

22:16:27

130 knots **2280** feet Shaker **ON** Pusher **OFF** Power Condition Flap



Heading **247** °

Pedal L R

Auto Pilot **OFF** Gear **DOWN**

Probable Cause

- "… the captain's inappropriate response to the activation of the stick shaker, which led to an aerodynamic stall from which the airplane did not recover.

  Contributing to the accident: (1) the flight crew's failure to monitor airspeed in relation to the rising position of the low speed Cue…"

Barriers to Effective Monitoring

- Boredom
- Complacency
- Fatigue
- Time Pressure
- Mental workload
- Lack of vigilance
- Looking without seeing
  - Change blindness
  - Inattention blindness
- Poor workload management/ task allocation

Change Blindness

- “People are surprisingly poor at detecting even gross changes in a visual stimulus if they occur in objects that are not the focus of attention.”

  - S. Palmer, 1999, *Vision Science*.


MACH
ALT CRZ
NAV
AP1
1FD2
A/THR
300
280
260
240
220
.80
375
370
365
STD
10
10
10
10
4
5
6
7
8


MACH
ALT CRZ
NAV
1FD2
A/THR
300
280
260
240
220
.80
375
365
37000
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Inattentional Blindness

NTSB

“If I had been watching the instruments, I could have prevented the accident.”

- First Officer in fatal CFIT accident

Things that keep Robert up at night

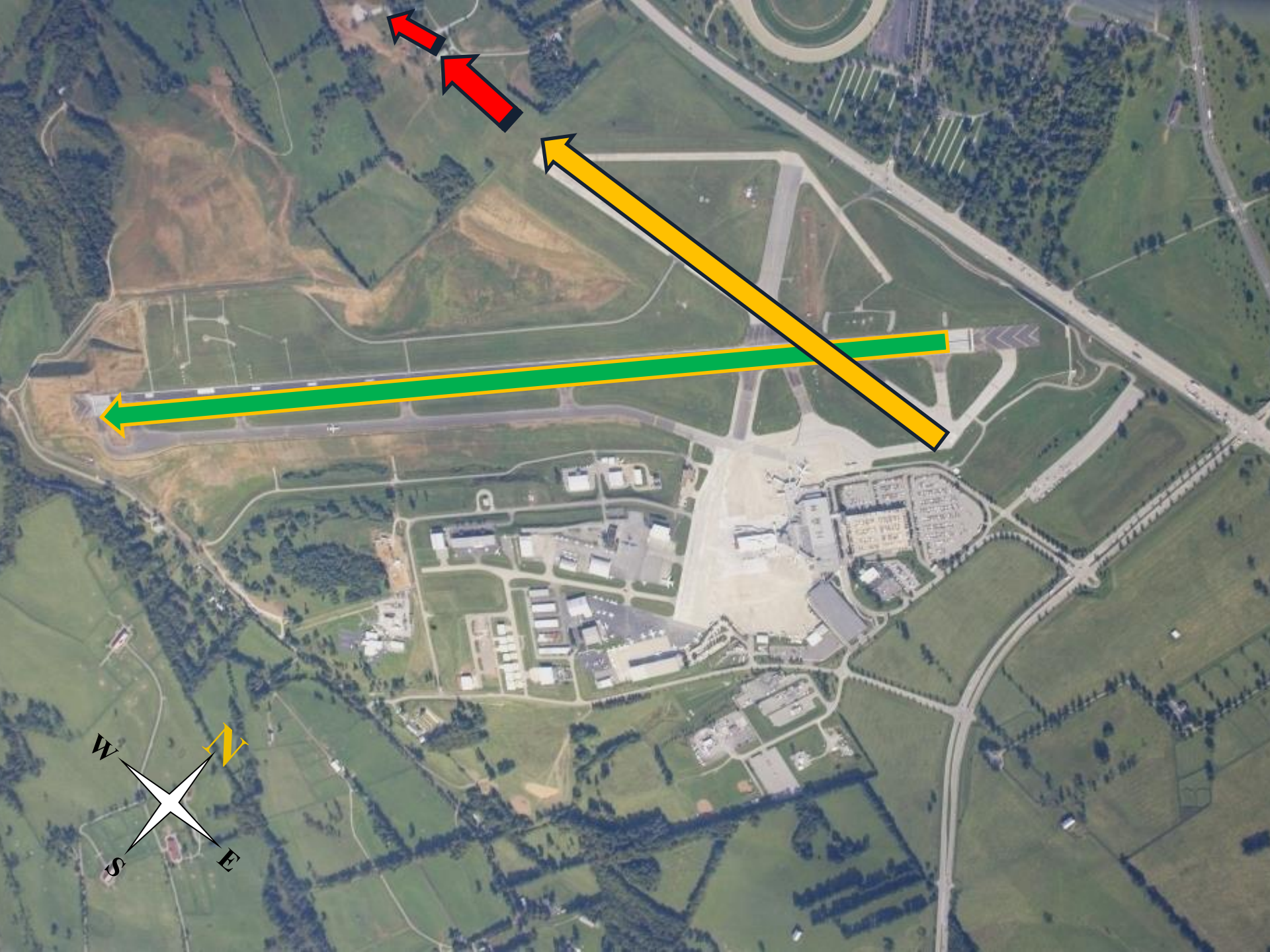
- Problems with flight path monitoring and cross-checking
- Lack of SOP discipline

USAir 1016

- July 2, 1994
- Charlotte, NC
- 37 fatalities

Comair Airlines Flight 5191
Lexington, Kentucky

- Bombardier CRJ
- 49 Fatalities
- First officer severely injured
- Wrong runway attempted takeoff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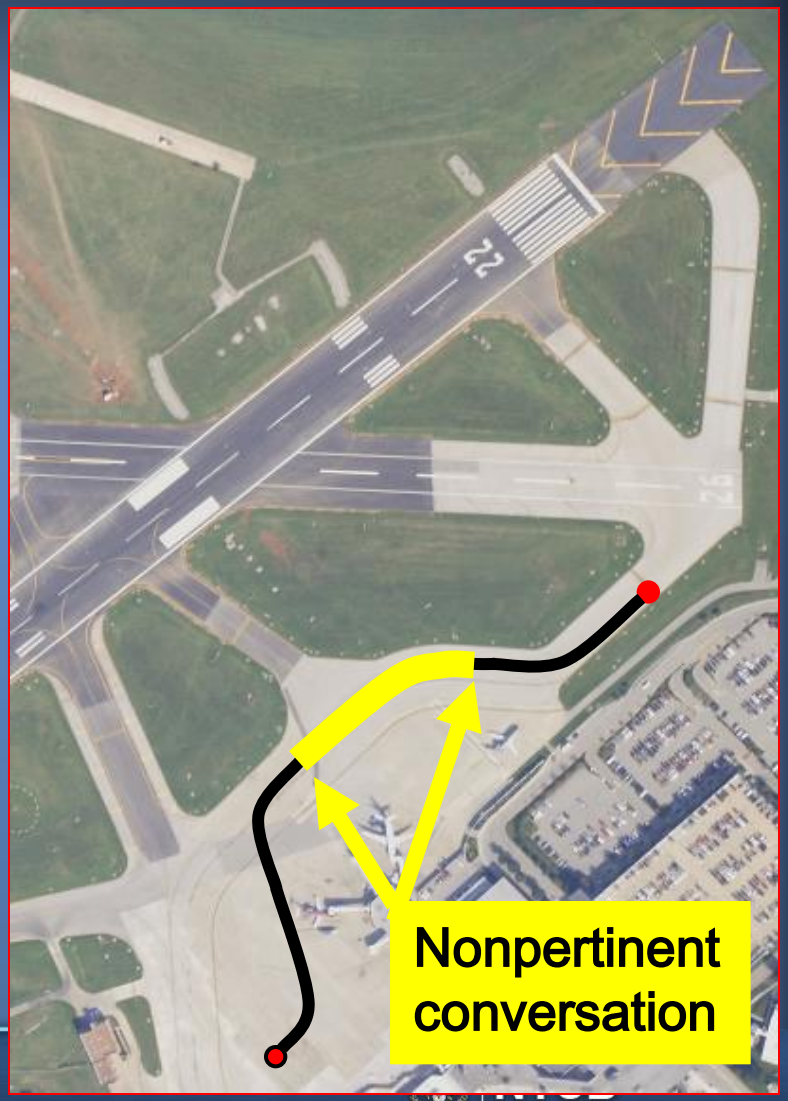
Crew Actions

- Noncompliance with sterile cockpit rule
  - 40 of the 150 seconds during taxi were violations of sterile cockpit rule
- Distraction likely contributed to loss of positional awareness



NTSB Finding

- "The flight crew's noncompliance with standard operating procedures, including the captain's abbreviated taxi briefing and both pilots' nonpertinent conversation, most likely created an atmosphere in the cockpit that enabled the crew's errors."


U·S
246
US Airways Express
January 19, 2010
Charleston, WV
Approximate location
of stopped aircraft.

Probable cause

- "…the flight crewmembers' unprofessional behavior, including their non-adherence to sterile cockpit procedures by engaging in non-pertinent conversation, which distracted them from their primary flight-related duties and led to their failure to correctly set and verify the flaps."

Intentional non-compliance leads to other problems

- LOSA data revealed that, compared to crews who followed SOPs, crewmembers who intentionally deviated from procedures:
  - averaged making three times more errors
  - mismanaged more errors
  - found themselves in more undesired aircraft situations.

Pinnacle Airlines Flight 3701
Jefferson City, Missouri

- October 14, 2004
- Bombardier CL-600-2B19
- Repositioning flight
- Both flight crewmembers killed

What the investigation discovered

- Intentional activation of stall warning
- Swapping crew seats
- Rudder mishandling
- Climb to FL 410
  - “have a little fun”
- Automation mismanagement
- Airspeed loss, stall, loss of control, double engine failure
- Did not fully disclose real problem with ATC

NTSB's Probable Cause

- "the pilots' unprofessional behavior, deviation from standard operating procedures, and poor airmanship, which resulted in an in-flight emergency from which they were unable to recover…"

NTSB

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